Report of the 2004 annual, aerial, damage detection survey of the Allegheny National Forest conducted 8-9 July 04

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Summary

The 2004 Aerial Damage Detection Survey of the Allegheny National Forest was notable for three things. First, no significant defoliation was detected. Secondly, while some blowdown was recorded it was difficult to detect. July is not an optimal time to look for blowdown, for the expanded crowns of the surviving trees obscure the wind-thrown trees. Surveying for blowdown should be done as soon as possible after the wind event. Thirdly, in 2004 there was significant yellowing of American beech trees being impacted by the beech scale.

On the 8th and 9th of July 2004 observers Lauren Miles (ANF) and Martin MacKenzie (MFO) conducted an aerial survey of the ANF, using a fixed wing Cessna 210. Sketch mapping was done on an airborne digital platform using, real time onboard GPS and, 1:100,000 scale scrolling maps on a touch screen. This was the first time the author had flown the forest using this technology. With observers on opposite sides of the plane, predetermined East West flight lines 4 miles apart were used. Thus each observer was responsible for a 2 mile wide swath. After the first days flying when it became obvious that there would be little or no defoliation to record, the mission was expanded to obtain additional information specific to Beech Bark Disease.

Blowdown. The survey of April 28 & 29, 2004

In the 2003 aerial survey of the ANF, (conducted on the 7th and 13th of August 2003) some 13,404 acres of scattered blowdown and branch breakage were recorded (reported by Turcotte NA-03-18, 19 September, 2003). This blowdown came essentially from a single windstorm on the 21st of July 2003. To ensure that there had not been an underestimate of the extent of the blowdown, Richard Turcotte (MFO) and Lauren Miles (ANF) made a special flight, on April 28 and 29th 2004 to assess the blowdown. They recorded 131 polygons of blowdown, totaling 3,443 acres. As these 131 polygons were recorded in 2004 and are not reported elsewhere they have been included in this report.

Date	Polygons mapped	Total acres mapped
Aug 7 & 13 2003	283	13,404
April 28 & 29 2004	131	3,443
July 8 & 9 2004	7	315

The above table makes it abundantly clear that aerial flights to assess blowdown must be made as soon as possible after the wind event that caused the blowdown. Less than one year after the blowdown (of July 2003), observers, who were familiar with the blowdown, sketch mapped less than 3% of it. The crowns of the trees that survive the blowdown expand quickly to take advantage of the increased light and growing space, the blowdown provides, and in this way they quickly obscure the windthrown trees from aerial observers. This underscores the ability of the forest to overcome wind events. The ANF has been experiencing windstorms for thousands of years and has the resiliency to overcome them. The forest structure we see today reflects the ability of the forest to recover from the numerous ice and windstorms, that it has been subjected to over the last 80 to 90 years.

The Survey of 8 & 9 July 2004.

While the attached map contains 455 polygons, the rest of this report will concentrate on the 292 polygons (24,186 acres) that were mapped, within the proclamation boundary of the forest, on the 8 & 9th July 2004 (see table below for a breakdown by acres).

The 2004 aerial survey of the ANF

Category	Polygons Mapped	Acres mapped
BBD scale	178	12,824
BBD mortality	66	8,356
Old mortality	23	1,294
Unknown mortality	4	1,047
Bark beetle damage	8	136
Blowdown (recorded 7/8 & 9)	7	315
All other damages & discolorations	6	214

Hemlock Woolly Adelgid. (0 polygons, 0 acres impacted)
Although an effort was made to find declining Eastern Hemlocks none were found.

Bark beetles. (8 polygons, 136 acres impacted)
Occasional areas of bark beetle damage were recorded but these were restricted (obviously) to the Forest's limited conifer resource. Many of these stands have been previously visited and were known to be impacted by red pine pocket decline and from which the author and entomologist Turcotte have both previously recovered ***Ips*** beetles.

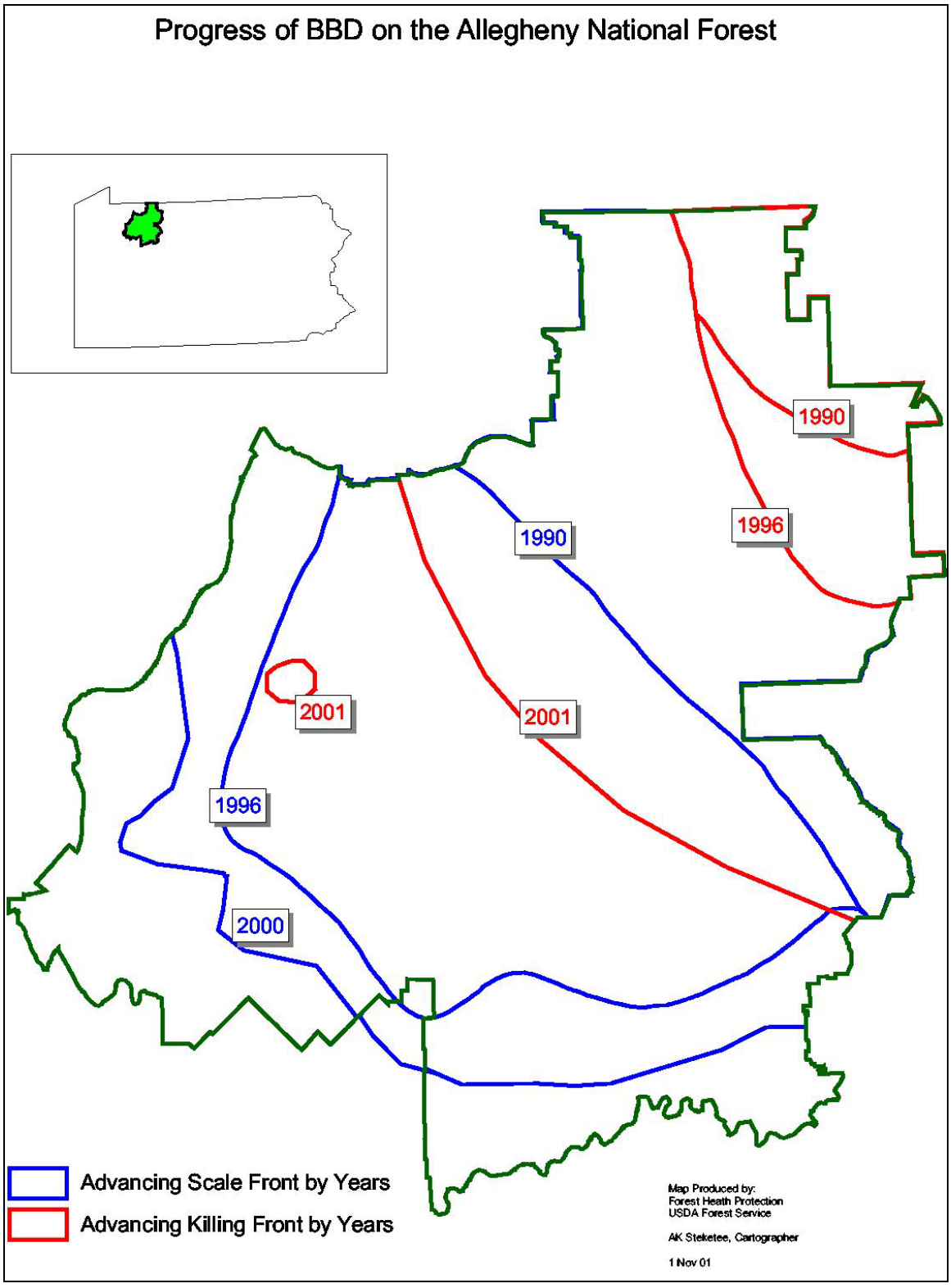
Blowdown. (discussed above)

Old Mortality of undeterminable causes. (27 polygons, 2,341 acres impacted)
Mortality recorded by the previous year's aerial flights does not disappear by the time of the next year's aerial survey. Thus there must be a category for dead trees that had been mapped previously. This category was created to accommodate, widely scattered dead trees. Some of this might be a reflection of past episodes of sugar maple decline, or occasional gypsy moth kills. Depending upon how the observers coded this mortality, there were either a few large areas with widely scattered long dead crowns or many small areas with a few dead trees in each.

Miscellaneous damages and discolorations. (6 polygons, 214 acres impacted)
This category included less than 1% of the mapped area.

BBD & beech scale impacted beech. (292 polygons, 21,180 acres impacted)
The most significant forest damage observed in 2004, was coded BBD, it accounted for 88 % (21,180 acres) of the mapped area. The 21,180 acres (266 polygons) of unhealthy beech were placed into 1 of 2 categories. BBD without a mortality component was reserved for scale only areas and BBD with a mortality component was used for fully developed BBD areas. Thus areas could be classified as belonging to either the killing front or to the advancing scale front

When discussing the "old mortality class" it should be noted that by reviewing a series of past aerial sketch maps it is possible to observe the expansion of BBD areas and, to observe them change from scale front to killing front. In fact, such a review was one of the components that went into drawing the 2001 killing front (map 1).



MAP 1. The Historical Development of BBD on The ANF.

1. Very few areas of stressed or dead beech were recorded behind the 1990 killing front (see Map 1 for the historical fronts).
2. The great majority of BBD areas were located between the1996 and the 2001 killing fronts.
3. Several small areas of BBD were recorded ahead of the 2001 killing front.
4. Observations of BBD south of the Clarion River support the hypothesis that the advancing front (scale) has spread off the forest, onto state land, to the South and West. Although not included in the tables above 27 polygons coded BBD were recorded outside the forest proclamation boundary. Sixteen of them contained mortality and 11 had only discolored beech crowns. This data (see attached map) was collected to support the hypothesis that the scale has swept over and out of the forest.
5. The additional flight lines along, and to the SW of, the 2001 killing front support the hypothesis that the BBD killing front has made minimal advance since 2001. (Or alternatively, the 2001 killing front was not drawn conservatively enough).

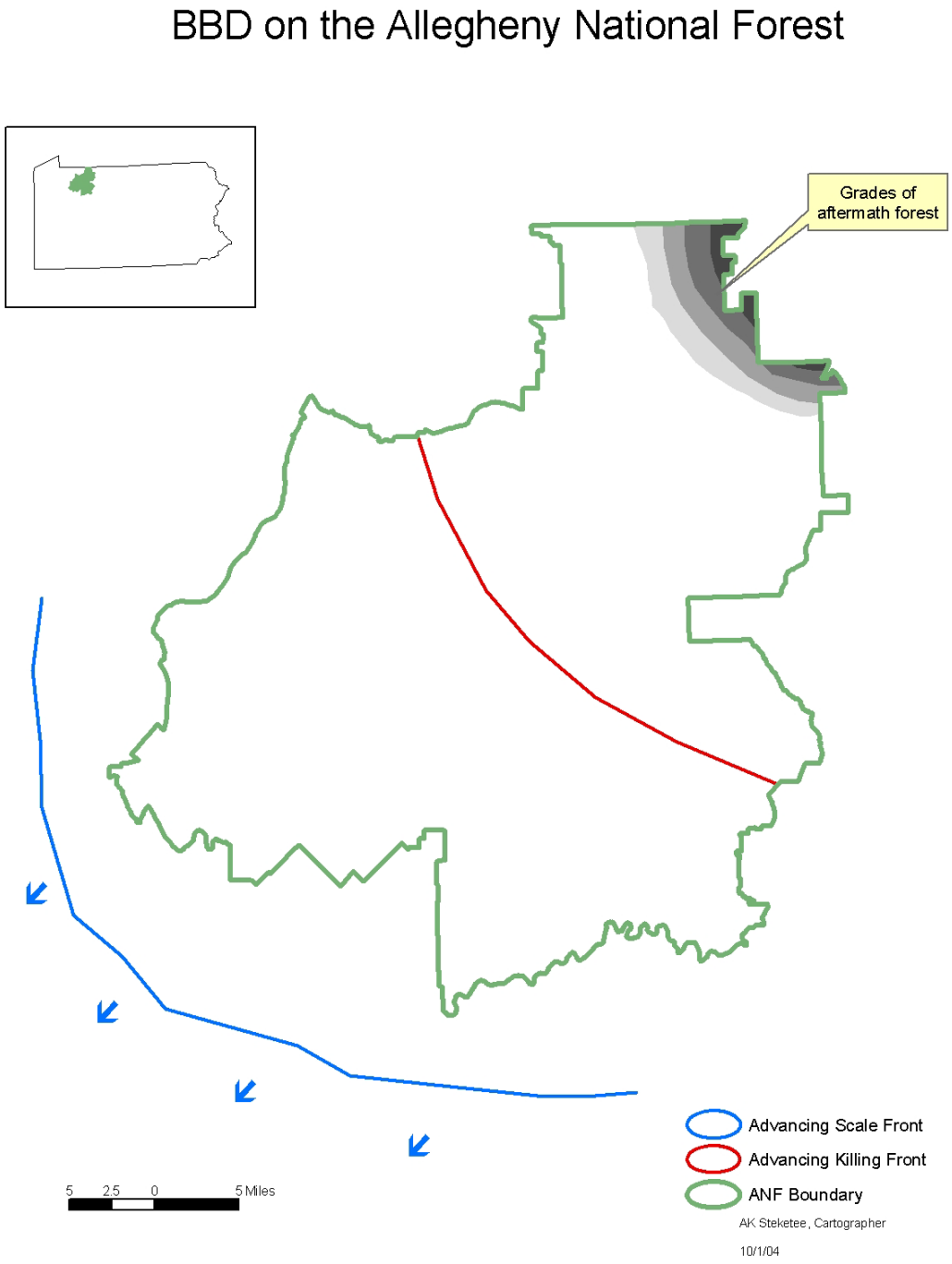
On the second day of the aerial survey a special flight line was made to fly over the Lewis Run sale area, plus Compartments 406 and 433. All three of these areas are behind the 1990 killing front and an extensive ground survey in 2003 revealed that about 2/3 of the beech basal area in Compartments 406 and 433 had died since 1991. As a careful inspection of all three areas failed to show any stressed beech, it is proposed that the area behind the 1990 killing front be designated "Aftermath" forest. However, small areas stressed scale and BBD will continue to appear as the scale builds up on trees that escaped the first wave of the insect

To ascertain the validity of the 2001 killing front additional flight lines were made along the 2001 killing front. This exercise marked about 60 polygons with, 56 being scale only while the other 4 contained some level of mortality. This exercise demonstrated the versatility of the airborne sketch mapping platform. Once the map line had been flown it was recorded as a flightline on the (touch screen) map and, as the real time GPS recorded the planes position the pilot would have been able to have flown an offset from a non linear flight line. An offset was not flown because in the first flight the polygons were predominately "scale only". With this system of mapping the observers are no longer restricted to straight N/S or E/W flightlines.

Summary of proposed changes to the 2001 ANF BBD map.

- **The killing front should remain essentially where it was drawn in 2001.**
- **The advancing front should be redrawn beyond the proclamation boundary of the forest,** although how far south and east of the forest is not known at this time**.**
- **Much of the area behind the 1990 killing front should now be classified as "aftermath forest".**

The above summary points have been represented in Map 2



MAP 2. BBD on the ANF as of July 9th 2004.